

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (Previously Presented) A method for preparing lithium transitional metal oxides, comprising the steps of:

preparing a carbonate precursor using the following substeps:

forming a first aqueous solution containing a mixture of at least two of the ions of the following metal elements (“Meⁿ⁺”): cobalt (Co), nickel (Ni), and manganese (Mn);

forming a second aqueous solution containing ions of CO₃²⁻; and

mixing and reacting said first solution and said second solution to produce the carbonate precursor, Ni_{1-x-y}Co_xMn_yCO₃; and

preparing said lithium transition metals oxide from said carbonate precursors using the following substeps:

evenly mixing Li₂CO₃ and said carbonate precursor;

calcinating the mixed material in high temperature; and

cooling and pulverizing the calcinated material to obtain said lithium transition metal oxide, Li Ni_{1-x-y}Co_xMn_yO₂.

2. (Previously Presented) The method of claim 1 wherein the calcinating step is performed in air.

3. (Previously Presented) The method of claim 1 further comprising a step after the cooling step, again calcinating said cooled and pulverized material in air at high temperature.
4. (Previously Presented) The method of claim 3 further comprising a step after the again calcinating step, cooling, ballmilling, and sifting the again calcinated material to obtain the compound of lithium transition metal oxide, $\text{Li Ni}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$.
5. (Previously Presented) The method of claim 1 wherein the mixing and reacting substep is performed under the condition where the PH is between 5 to 10.
6. (Previously Presented) The method of claim 1 wherein the mixing and reacting substep is performed under the condition where the reaction temperature is between 30 degrees to 90 degrees Celsius.
7. (Previously Presented) The method of claim 1 wherein the mixing and reacting substep is performed under the condition where the stirring speed is between 20 to 120 revolutions per minute.
8. (Previously Presented) The method of claim 1 wherein the mixing Li_2CO_3 substep is performed under the condition where the calcination is at 500 to 800°C.

9. (Previously Presented) The method of claim 3 wherein the again calcinating step is performed under the condition where the calcination is at 700 to 950°C.

10. (Previously Presented) The method of Claim 1 wherein the ion concentration of the first solution is 0.1 to 3.0 mol/l.

11. (Previously Presented) The method of claim 10 wherein the Me^{n+} derives from at least one of the compounds from the following groups of materials: sulfates, nitrates, chlorides, acetates, other water soluble inorganic salts, and, other water soluble salts of organic acid.

12. (Previously Presented) The method of claim 1 wherein the first solution contains at least one type of additive ingredient from the group containing the ions of the following elements: Ca, Mg, Zn, Y, Ga, and In.

13. (Previously Presented) The method of claim 12 wherein the molar concentration of the additive ingredient is of 0 to 10% of the overall solution.

14. (Previously Presented) The method of claim 1 wherein the CO_3^{2-} ion concentration of the second solution is 0.1 to 3.0 mol/l.

15. (Previously Presented) The method of claim 1 further including a third solution in the preparation of the carbonate precursor wherein the third solution is a NaOH solution; and

wherein the condition for preparing said carbonate precursor is where the flow rate is adjusted for the reaction to proceed at PH between 8 to 9 and the temperature is between 30-90°C.

16. (Previously Presented) The method of claim 1 wherein said first solution is an aqueous solution of the combination of the sulfates salts of cobalt, nickel, and manganese; and said second solution is $(\text{NH}_4)_2\text{CO}_3$; and further including a third solution that is a $\text{NH}_3\cdot\text{H}_2\text{O}$ solution in the preparation of said carbonate precursor where the flow rate is adjusted for the reaction to proceed at the PH level between 8 to 9 and the temperature is between 30 to 90°C.

17. (Previously Presented) The method of claim 1 wherein the mixing the Li_2CO_3 step is to first wet mixing with an organic solvent such as ethanol.

18. (Previously Presented) A method for preparing lithium transitional metal oxides, comprising the steps of:

preparing a carbonate precursor using the following substeps:

forming a first aqueous solution containing a mixture of at least two of the ions of the following metal elements (“ Me^{n+} ”): cobalt (Co), nickel (Ni), and manganese (Mn), wherein the ion concentration of the first solution is 0.1 to 3.0 mol/l; wherein the first solution contains at least one type of additive ingredient from the group containing the ions of the following elements: Ca, Mg, Zn, Y, Ga, and In; and wherein the molar concentration of the additive ingredient is of 0 to 10% of the overall solution;

forming a second aqueous solution containing ions of CO_3^{2-} ; and

mixing and reacting said first solution and said second solution to produce the carbonate precursor, $\text{Ni}_{1-x-y}\text{Co}_x\text{Mn}_y\text{CO}_3$, under the conditions where the PH is between 5 to 10, the reaction temperature is between 30 degrees to 90 degrees Celsius, and the stirring speed is between 20 to 120 revolutions per minute; and preparing said lithium transition metals oxide from said carbonate precursors using the following substeps:

evenly mixing Li_2CO_3 and said carbonate precursor; calcinating the mixed material in air in high temperature of 500 to 800°C; and cooling and pulverizing the calcinated material; again calcinating said cooled and pulverized material in air at high temperature of 700 to 950°C; and cooling, ballmilling, and sifting the again calcinated material to obtain the compound of lithium transition metal oxide, $\text{Li Ni}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$.

19. (Previously Presented) The method of claim 18 wherein the Me^{n+} derives from at least one of the compounds from the following groups of materials: sulfates, nitrates, chlorides, acetates, other water soluble inorganic salts, and, other water soluble salts of organic acid.

20. (Previously Presented) The method of claim 18 wherein the CO_3^{2-} ion concentration of the second solution is 0.1 to 3.0 mol/l.